

REMARKS

This paper is submitted in reply to the Office Action dated July 14, 2006, within the three-month period for response (given that October 14, 2006 is a Saturday).

Reconsideration and allowance of all pending claims are respectfully requested.

In the subject Office Action, claims 1, 3, 7-8 and 15 were objected to. In addition, claims 20-23 were rejected under 35 U.S.C. § 101. Furthermore, claims 1-6, 9-15 and 18-24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,975,447 to Goel et al. in view of U.S. Patent No. 6,757,677 to Pham et al.; and claims 7-8 and 16-17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Goel in view of Pham, and further in view of U.S. Patent No. 5,598,559 to Chaudhuri.

Applicants respectfully traverse the Examiner's rejections to the extent that they are maintained. Applicants have amended claims 1, 3, 7-8, 15, 20 and 22 herein, and Applicants respectfully submit that no new matter is being added by the above amendments, as the amendments are fully supported in the specification, drawings and claims as originally filed.

Now turning to the subject Office Action, and specifically to the Examiner's objections to claims 1, 3, 7-8 and 15, the Examiner will note that Applicants have amended all of these claims in accordance with the Examiner's suggestions. Applicants thank the Examiner for the careful review of the Application. Withdrawal of the objections to claims 1, 3, 7-8 and 15 is therefore respectfully requested.

Next turning to the § 101 rejection of claims 20-23, the Examiner will note that Applicants have amended claims 20 and 22 to recite a "physical, computer readable signal bearing medium," support for which may be found in the Application at page 13, lines 10-12. Withdrawal of the § 101 rejections is therefore respectfully requested.

Next, turning to the art-based rejections, and more specifically to the rejection of independent claim 1, this claim generally recites a method for optimizing a database query, the database query including criteria that references a plurality of tables in order to re-order a result set generated for the database query. The method includes the steps of:

applying transitive closure analysis to the query, and based on the transitive closure analysis, rewriting the criteria to generate modified criteria to reduce the number of tables referenced thereby.

In rejecting claim 1, the Examiner relies on Goel and Pham. The Examiner asserts that Goel discloses applying transitive closure analysis to a query at col. 3, lines 26-30. The Examiner admits, however, that Goel does not disclose rewriting a query to generate modified criteria to reduce the number of tables referenced thereby. For this, the Examiner cites Pham, and in particular the abstract, col. 2, lines 35-48 and col. 9, lines 9-13, for allegedly disclosing this latter feature.

It is important to note, however, that claim 1 recites in part that transitive closure analysis is performed for the purpose of rewriting a criteria that re-orders a result set to reduce the number of tables referenced by that criteria. As noted in the Application, common examples of such criteria are GROUP BY and ORDER BY clauses, which are commonly found in SQL queries.

Goel generally discloses the use of transitive closure analysis in SQL queries, including queries including selection, projection, join, outer join, and intersection operations. As the Examiner correctly notes, however, Goel does not disclose rewriting a criteria that re-orders a result set based upon transitive closure analysis to reduce the number of tables referenced by the criteria.

Pham, however, does not remedy this shortcoming of Goel. Pham does disclose the optimization of queries including GROUP BY clauses; however, there is no disclosure of applying transitive closure analysis to the GROUP BY clauses, nor of doing so for the purpose of reducing the number of tables referenced by such clauses. The passages in the abstract and at col. 1, lines 47-53, among others, do disclose reducing the number of rows of a table by performing a partial group-by; however, there is nothing in the reference that refers to reducing the number of tables referenced by a GROUP BY clause.

While Goel and Pham both generally attempt to optimize queries with GROUP BY clauses, neither reference, alone or in combination, discloses or suggests rewriting a GROUP BY clause, or any other criteria that re-orders a result set, to reduce the number

of tables referenced by that criteria. Moreover, neither reference discloses or suggests doing so through the use of transitive closure analysis. Indeed, Applicants cannot even find any disclosure in either reference directed to rewriting any criteria that re-orders a result set. Applicants accordingly submit that the combination proposed by the Examiner does not disclose or suggest each and every limitation of claim 1, so the rejection of claim 1 should be withdrawn.

Applicants therefore respectfully submit that independent claim 1 is non-obvious over Goel and Pham. Reconsideration and allowance of claim 1, and of claims 2-9 which depend therefrom, are therefore respectfully requested.

Next, turning to the rejection of independent claim 10, this claim generally recites a method of optimizing a database query, where the database query includes criteria that operates to re-order a result set of the database query and requires creating a temporary file during operation. The method includes applying transitive closure analysis to the query, and rewriting the criteria, based on the transitive closure analysis, to generate a modified criteria, where the modified criteria operates to re-order a result set of the database query and avoid creating a temporary file during operation.

In rejecting claim 10, the Examiner again relies on Goel and Pham. The Examiner asserts that Goel discloses applying transitive closure analysis to a query at col. 3, lines 26-30. The Examiner admits, however, that Goel does not disclose rewriting a query to generate modified criteria to re-order a result set of the database query and avoid creating a temporary file during operation. For this, the Examiner cites Pham, and in particular the abstract, col. 2, lines 35-48, col. 6, lines 46-65 and col. 9, lines 9-13, for allegedly disclosing this latter feature.

It is important to note, however, that claim 10 recites in part that transitive closure analysis is performed on a criteria that re-orders a result set for a query and requires creating a temporary file during operation. Claim 10 further recites that the transitive closure analysis is performed for the purpose of rewriting the criteria to re-order a result set and avoid creating a temporary file. Applicants respectfully submit that neither reference discloses or suggests such features.

Goel generally discloses the use of transitive closure analysis in SQL queries, including queries including selection, projection, join, outer join, and intersection operations. As the Examiner correctly notes, however, Goel does not disclose rewriting a criteria that re-orders a result set based upon transitive closure analysis to avoid creating a temporary file.

Pham, however, does not remedy this shortcoming of Goel. Pham does disclose the optimization of queries including GROUP BY clauses; however, there is no disclosure of applying transitive closure analysis to the GROUP BY clauses, nor of doing so for the purpose of avoiding the creation of a temporary file. None of the cited passages in Pham, in particular, disclose any elimination of a temporary file through rewriting any portion of a query, and consequently, Applicants fail to see how any of these passages purportedly teach the concepts the Examiner apparently attributes to these passages.

Indeed, Pham does not even appear to appreciate the desirability of rewriting a criteria in a database query to avoid the creation of a temporary file that would otherwise be required to be created in the original version of the criteria. Absent any such appreciation of either the problem or a solution thereto, Applicants submit that one of ordinary skill in the art would not look to Pham to modify Goel to incorporate any such functionality.

While Goel and Pham both generally attempt to optimize queries with GROUP BY clauses, neither reference, alone or in combination, discloses or suggests rewriting a GROUP BY clause, or any other criteria that re-orders a result set, to avoid the creation of a temporary file. Moreover, neither reference discloses or suggests doing so through the use of transitive closure analysis. Applicants accordingly submit that the combination proposed by the Examiner does not disclose or suggest each and every limitation of claim 10, so the rejection of claim 10 should be withdrawn.

Applicants therefore respectfully submit that independent claim 10 is non-obvious over Goel and Pham. Reconsideration and allowance of claim 10, and of claims 11-12 which depend therefrom, are therefore respectfully requested.

Next, with regard to the Examiner's rejection of independent claim 13, this claim generally recites a method for optimizing a database query, where the database query

involves a plurality of join operations and a plurality of search conditions. The method includes applying transitive closure analysis to the plurality of search conditions to determine a subset of equivalent search fields, and rewriting a criteria, that operates to re-order a result set of the database query, to generate a set of respective modified criteria that each reference one or more equivalent search fields.

In rejecting claim 13, the Examiner again relies on Goel and Pham. The Examiner asserts that Goel discloses applying transitive closure analysis to a query at col. 3, lines 26-30. The Examiner admits, however, that Goel does not disclose rewriting a criteria, that operates to re-order a result set of the database query, to generate a set of respective modified criteria that each reference one or more equivalent search fields. For this, the Examiner cites Pham, and in particular the abstract, col. 2, lines 35-48, and col. 9, lines 9-13, for allegedly disclosing this latter feature.

At nowhere in any of the cited passages of Pham, however, is there any discussion or suggestion of rewriting a criteria that operates to re-order a result set, much less doing so to generate a set of modified criteria that each reference one or more equivalent search fields, as required by claim 13. The cited passages discuss the use of partial group-by operators; however, Applicants can find no reference to modifying a criteria in a query that re-orders a result set. In addition, Applicants can find no reference to rewriting any portion of a query to reference equivalent search fields, much less to do so based upon transitive closure analysis that determines equivalent search fields. Other than the fact that Goel mentions transitive closure analysis, and Pham discloses group-by operators, Applicants can find no relevance for either reference with respect to the limitations of claim 13.

Applicants therefore respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness as to independent claim 13, and that the claim is non-obvious over Goel and Pham. Reconsideration and allowance of claim 13, and of claims 14-19 which depend therefrom, are therefore respectfully requested.

Next, with respect to independent claims 20 and 24, these claims recite in part the concept of rewriting a query that re-orders a result set based upon transitive closure analysis to reduce the number of tables referenced thereby. As discussed above in

connection with claim 1, however, the prior art of record does not disclose or suggest this combination of features. Applicants therefore traverse the Examiner's rejections based upon the same reasons as presented above in connection with claim 1. Reconsideration and allowance of claim 20 and 24, and of claim 21 which depends therefrom, are therefore respectfully requested.

Next, with respect to independent claim 22, this claim recites in part the application of transitive closure analysis to a plurality of search conditions to determine a subset of equivalent search fields within a database query involving a plurality of join operations and the plurality of search conditions, and the rewriting of a criteria, that operates to re-order a result set of the database query, to generate a set of respective modified criteria that each reference one or more equivalent search fields. As discussed above in connection with claim 13, however, the prior art of record does not disclose or suggest this combination of features. Applicants therefore traverse the Examiner's rejections based upon the same reasons as presented above in connection with claim 13. Reconsideration and allowance of claim 22, and of claim 23 which depends therefrom, are therefore respectfully requested.

In summary, Applicants respectfully submit that all pending claims are novel and non-obvious over the prior art of record. Reconsideration and allowance of all pending claims are therefore respectfully requested. If the Examiner has any questions regarding the foregoing, or which might otherwise further this case onto allowance, the Examiner may contact the undersigned at (513) 241-2324. Moreover, if any other charges or credits

are necessary to complete this communication, please apply them to Deposit Account 23-3000.

Respectfully submitted,

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Date

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